

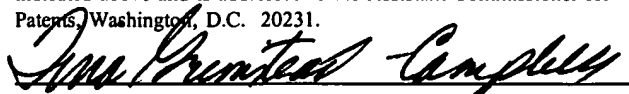
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## APPENDIX B

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Tina Grimstead-Campbell

## APPENDIX B

### String To ID Input And Output

For the correct operation of Card JVM it is very important that the declared and generated IDs are correctly managed. This management is controlled by the definitions in the string to ID input file **String-ID INMap**. This textual file, the basis for which is shown below, declares which areas of the namespace can be used for what purposes. One possible arrangement of this map may reserve some IDs for internal use by the Card JVM interpreter, and the rest is allocated to Card JVM applications.

```
#
# String-ID INMap file.
#
#      4000 - 7FFF   Available for application use.
#      F000 - FFFE   Reserved for Card JVM's internal use.
#
constantBase      F000      # The area from F000 to FFFF is reserved for
                             # Card JVM's internal use.
                             #
MainApplication      # F000 - Name of the startup class
                             # (changes for each application)
main()V              # F001 - Name of the startup method
                             # (may change for each application)
java/lang/Object      # F002
java/lang/String      # F003
<init>()V              # F004
<clinit>()V           # F005
[L                     # F006
[I                     # F007
[C                     # F008
[B                     # F009
[S                     # F000A
#
constantBase      FFF0      # This area is reserved for simple return types.
L                     # FFF0
V                     # FFF1
I                     # FFF2
S                     # FFF3
C                     # FFF4
B                     # FFF5
Z                     # FFF6
#
constantBase      4000      # From here on this space is application dependent.
```

Essentially, all applications which are to be loaded into a smart card are allocated their own IDs within the 0x4000 to 0x7FFF. This space is free for each application since no loaded application is permitted to access other applications.

Care must be taken on managing the IDs for preloaded class libraries. The management of these IDs is helped by the (optional) generation of the string to ID output file **String-ID OUTMap** file. This map is the **String-ID INMap** augmented with the new String-ID bindings. These bindings may be produced when the Card Class File Converter application terminates. The **String-ID OUTMap** is generated for support libraries and OS interfaces loaded on the card. This map may be used as the **String-ID INMap** for smart card applications using the support libraries and OS interfaces loaded on the card. When building new applications this file can generally be discarded.

As an example consider the following Java program, HelloSmartCard.java. When compiled it generates a class file HelloSmartCard.class. This class file has embedded in it strings that represent the class name, methods and type information. On the basis of the **String-ID INMap** described above Card Class File Converter generates a card class file that replaces the strings present in the class file with IDs allocated by Card Class File Converter. Table 1 lists the strings found in the constant pool of HelloSmartCard.class with their respective Card Class File Converter assigned IDs. Note that some strings (like "java/lang/Object") have a pre-assigned value (F002) and some strings (like "()V") get a new value (4004).

```
public class HelloSmartCard {
    public byte aVariable;

    public static void main() {
        HelloSmartCard h = new HelloSmartCard();
        h.aVariable = (byte)13;
    }
}
```

**Program : HelloSmartCard.java**

Offset (in Constant Pool)	String	ID	Mapped New/ Mapped/Old
00000A	"Code"	4000	New
000011	"SourceFile"	4001	New
00001E	"ConstantValue"	4002	New
00002E	"Exceptions"	4003	New
00003B	"HelloSmartCard"	F000	Old
00004C	"java/lang/Object"	F002	Old
000062	"<init>"	F004	Old
00006E	"()V"	4004	New
000074	"aVariable"	4005	New
00008A	"B"	FFF5	Old
00008E	"HelloSmartCard.java"	4006	New
0000B3	"main"	F001	Old

**Relevant entries of String-ID OUTMap**